Batch 02

Level 01

Semester 02 CCU1308

Network Technologies

Assignment 02

COLE-012235

Activity 01

The Network allows computers to connect and communicate with different computers via any medium. LAN, MAN and WAN are the three major types of the network designed to operate over the area they cover.

Local Area Network (LAN) –

LAN or Local Area Network connects network devices in such a way that personal computer and workstations can share data, tools and programs. The group of computers and devices are connected together by a switch, or stack of switches, using a private addressing scheme as defined by the TCP/IP protocol.

Metropolitan Area Network (MAN) –

MAN or Metropolitan area Network covers a larger area than that of a LAN and smaller area as compared to WAN. It connects two or more computers that are apart but resides in the same or different cities.

Wide Area Network (WAN) –

WAN or Wide Area Network is a computer network that extends over a large geographical area, although it might be confined within the bounds of a state or country.

A network topology is the pattern in which nodes (i.e., computers, printers, routers or other devices) are connected to a local area network (LAN) or other network via links (e.g., twisted pair copper wire cable or optical fiber cable). There are four principal topologies used in LANs: bus, ring, star and mesh.

Bus topology - Think of a straight line with connections coming off of it Star or spoke - This is like the spokes on a bike wheel. Connections go back to a central hub.

Ring topology - Everything is connected together in a ring shape. Should the path get broken somewhere data can flow the other way around and still.

Mesh topology - A full mesh is where every host is connected to every other host directly. A partial mesh is some hosts are connected to others providing some levels of redundancy.

Star topology - Star topology is a topology for a Local Area Network in which all nodes are individually connected to a central connection point, like a hub or a switch. A star takes more cable than e.g. a bus, but the benefit is that if a cable fails, only one node will be brought down.

Best network type – LAN

The benefit of using LAN is that you don't need permission from any Internet authority to add/remove/modify the devices on the LAN, while still gaining legitimate access to the Internet via a router.

The benefit to the networking world at large is that anyone can administer their own LANs, populating them abundantly, without consuming Internet administrative resources, and without consuming the finite resource of global IP addresses.

Activity 02

OSI Model :-

The OSI (Open System Interconnection) model is a reference model which is generally used as a guidance tool. It provides a standard framework of communication between the network and end user.

The OSI model consists of 7 layers :-

- Application Layer
- Presentation Layer
- Session Layer
- Transport Layer
- Network Layer
- Data Link Layer
- Physical Layer

TCP Model :-

TCP model is in a way an implementation of the OSI model. It is based on protocols around which Internet has been developed. This network architecture describes the set of protocols that allow communication across multiple diverse networks.

This model has 4 layers:-

- Application Layer Network Interface Layer
- Transport Layer

Internet Layer

Activity 03

Transmission Control Protocol/Internet Protocol (TCP/IP) - TCP/IP is the most commonly used protocol in the internet. They mainly deal with slicing the data into route sized packets and routing them along the communicating channel.

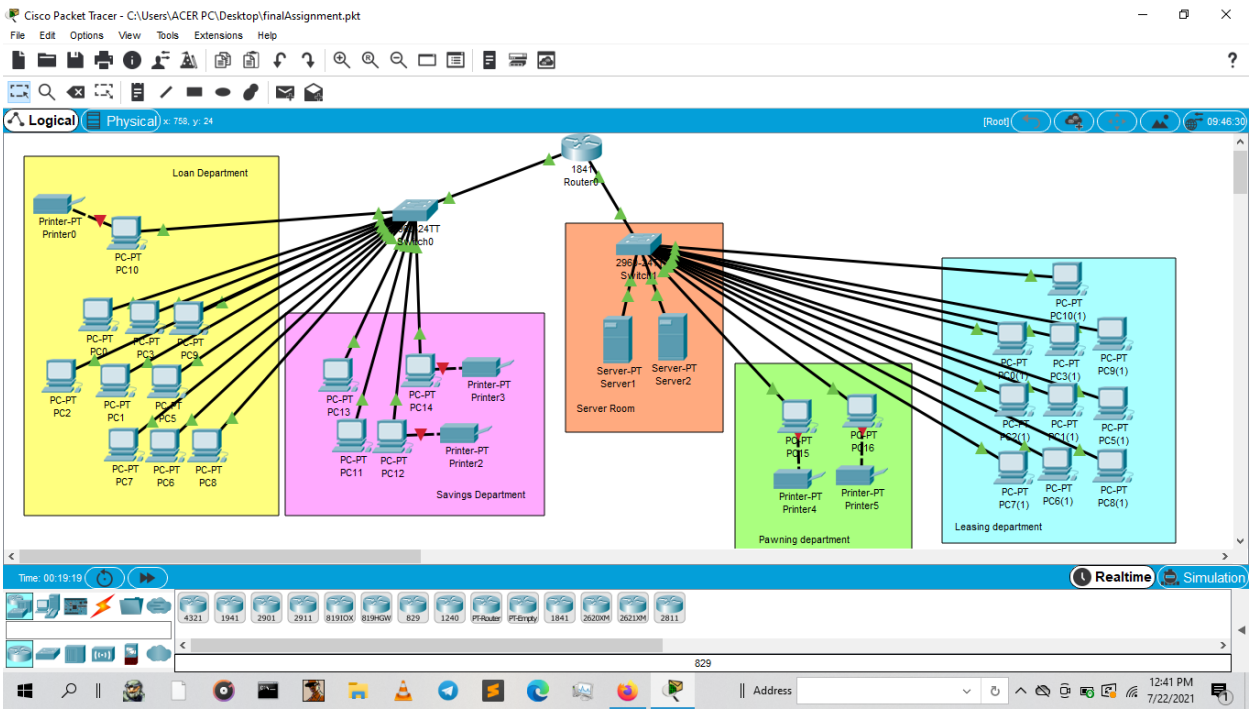
Simple Mail Transfer Protocol (SMTP) : SMTP protocol is used for delivery of e-mail. When an e-mail is to be sent, then the Mail Transfer Program contacts the remote machine and forms a TCP connection over which the mail is transferred. Once the connection is established, then Simple Mail Transfer Protocol(SMTP) identifies the sender itself, specifies the recipient of mail and then transfers the e-mail message.

File Transfer Protocol (FTP) : FTP enables files to be transferred between computers.

Hypertext Transfer Protocol (HTTP) : The Protocol used the World Wide Web is called HTTP. It is a set of rules that govern the transfer of hypertext between two or more computers.

Telnet : Telnet is used for running programs on remote computers. It is also referred to remote login. It is a very strong and powerful facility where one host may get the full command of another machine.

Activity 04



Activity 05

Server is a program and device that conduct functionality and service for other programs, these other programs are client. Servers are very dedicated because they do not take any other task apart from their server's task. Any kind of resources that computer share with client machine are known as server. Server shared their resources with client, this architecture called client/server architecture.

Here we discuss about Types of server-

1. Application Server- Application server present in between data base and end user. This server occupies a large piece of computing territory. Application server also known as middle ware.

2. Mail Server- Mail server is an application that used for the receiving and sending the email over the internet. This server receives the mail from the local user and forward and deliver it next.

3. Proxy Server- Proxy server is a software that works as a intermediate between two en points and run on a computer. A user or client is requesting a service to server via this proxy server.

4. Web Server- In the web server all transfer is mediated by the browser. Even server using HTTP for communicates to each other.

5. Real-Time Communication Server- Real-Time Communication Server also known as chat server. Client use his server as messaging server. Large number of users can exchange their information by using this server.

6. FTP Server- FTP stands for file transfer protocol. This server is the oldest server. FTP server is used for transfer the one or more files securely between two computer.

7. Collaboration Server- Collaboration server is used and designed so that clients can collaborate to each other via the internet, regardless of location and can do work together in a virtual environment. This server is also called "groupware".

8. List Server- List server is used for better manage mailing lists.

9. Telnet Server- Telnet server serves a host computer to clients on whom they log on and performs their task like remote computer.

10. Virtual Server- Virtual server is software and a program that runs as a shared program, but each client feels that they have complete control of a server.

Blade server- Blade server is a server with architecture of chassis housing multiple thin electronic circuit boards. Each blade serve for a single client and each blade have its own rights.

- **I have choosed Webserver for this network solution**

Advantages of the web server

- Optimum performance and high-level security
- More control and flexibility
- Stored in a safe infrastructure
- Easy to manage applications
- Customized server settings in compliance with your requirements

Activity 06

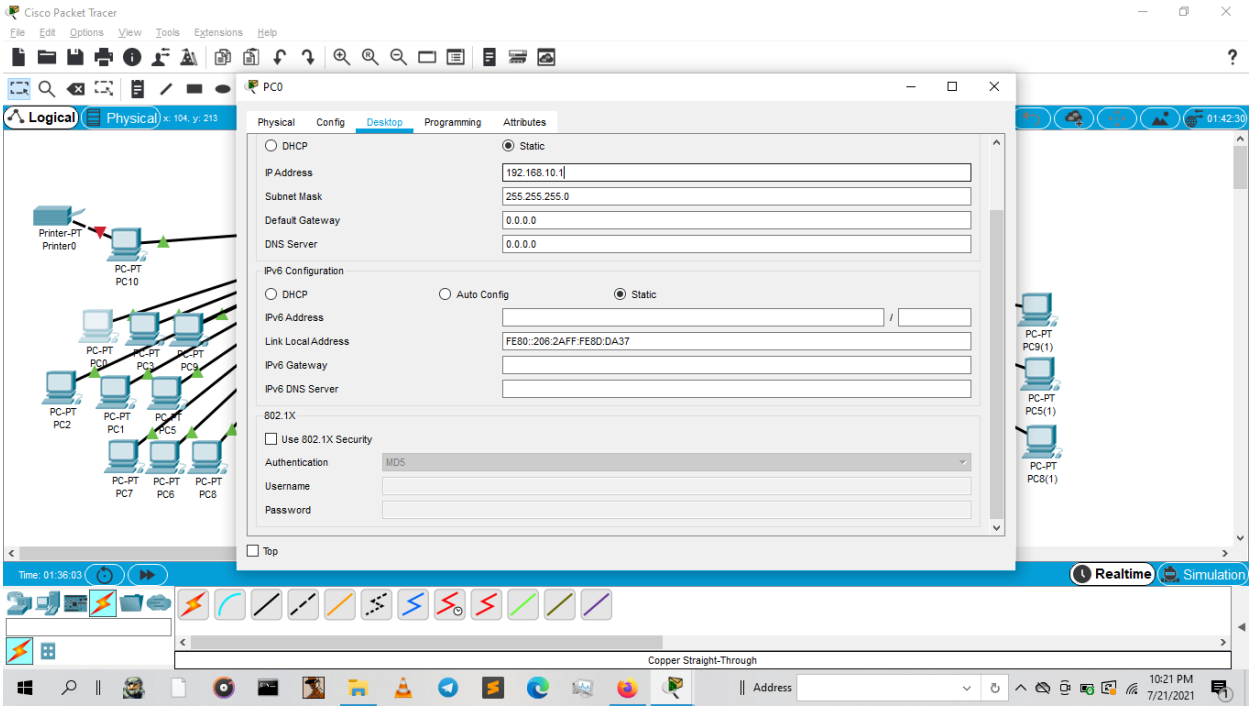
Feedback form

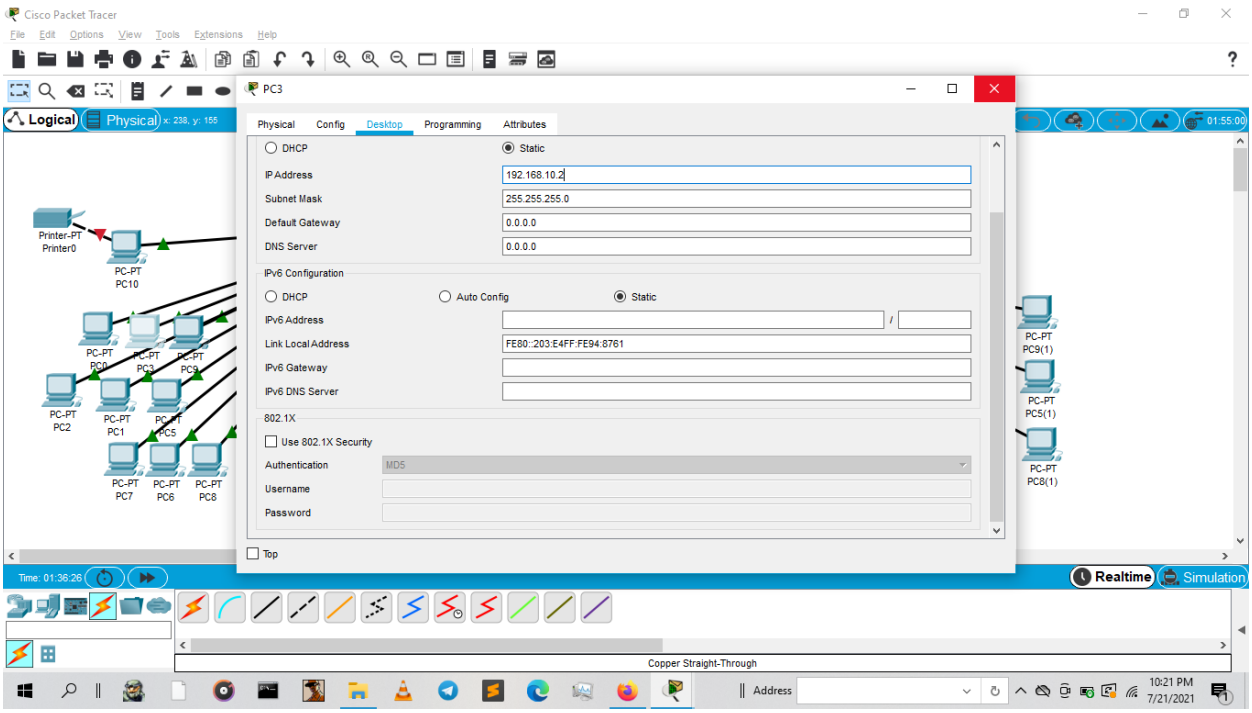
1. Name:
2. Role:
3. Are you happy about the network system of the company?
4. What do you think about the speed of the network?
5. How is the download speed?
6. How is the upload speed?
7. What's the average ping?

Identified problems

1. Poor Wi-Fi signal
2. Failing network cards
3. Incorrect drivers
4. IP address conflict
5. Unresponsive printers

Activity 07


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
PC0
Physical Config Desktop Programming Attributes
DHCP
Static
IP Address
192.168.10.1
Subnet Mask
255.255.255.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::206:2AFF:FE8D:DA37
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Printer-PT
Printer0
PC-PT
PC10
PC-PT
PC4
PC-PT
PC3
PC-PT
PC9
PC-PT
PC2
PC-PT
PC1
PC-PT
PC5
PC-PT
PC7
PC-PT
PC6
PC-PT
PC8
PC-PT
PC9(1)
PC-PT
PC5(1)
PC-PT
PC8(1)
Time: 01:36:03
Realtime
Simulation
Copper Straight-Through
Address
10:21 PM
7/21/2021


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical x: 238, y: 155
PC3
Physical Config Desktop Programming Attributes
DHCP
Static
IP Address 192.168.10.2
Subnet Mask 255.255.255.0
Default Gateway 0.0.0.0
DNS Server 0.0.0.0
IPv6 Configuration
DHCP Auto Config Static
IPv6 Address
Link Local Address FE80::203:E4FF:FE94:8761
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication MD5
Username
Password
Top
Printer-PT Printer0
PC-PT PC10
PC-PT PC0
PC-PT PC3
PC-PT PC9
PC-PT PC2
PC-PT PC1
PC-PT PC5
PC-PT PC7
PC-PT PC6
PC-PT PC8
PC-PT PC9(1)
PC-PT PC5(1)
PC-PT PC8(1)
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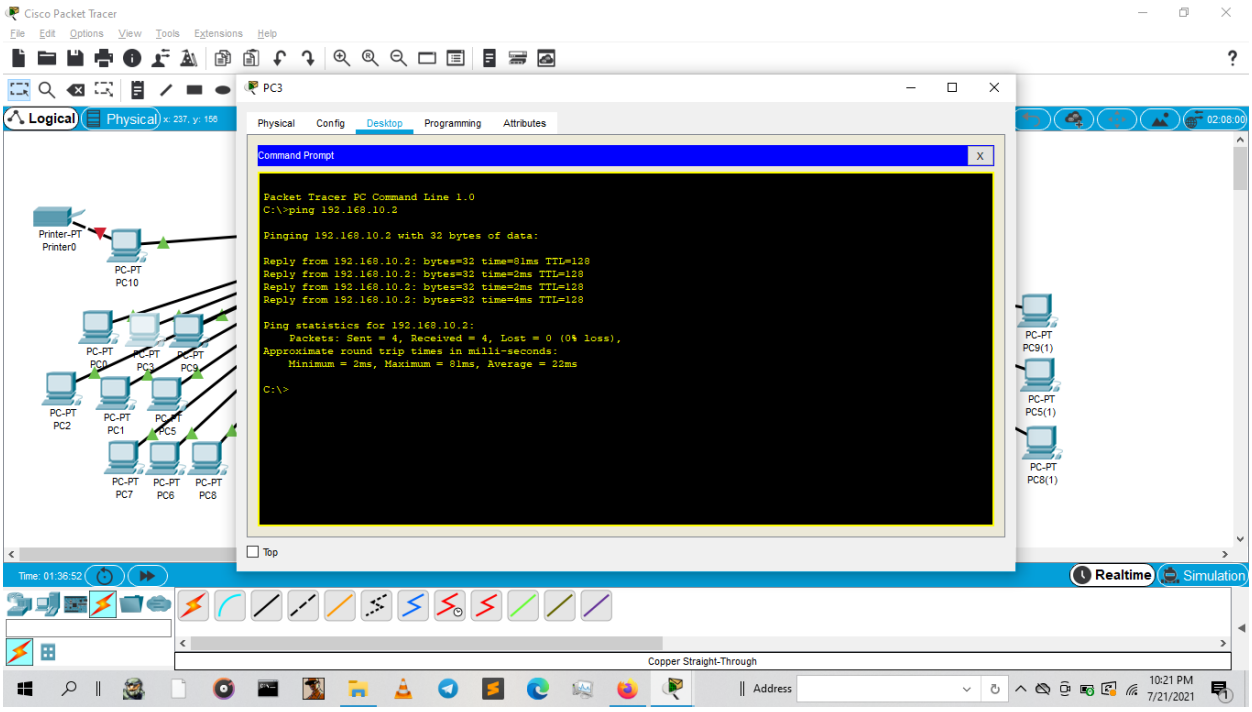
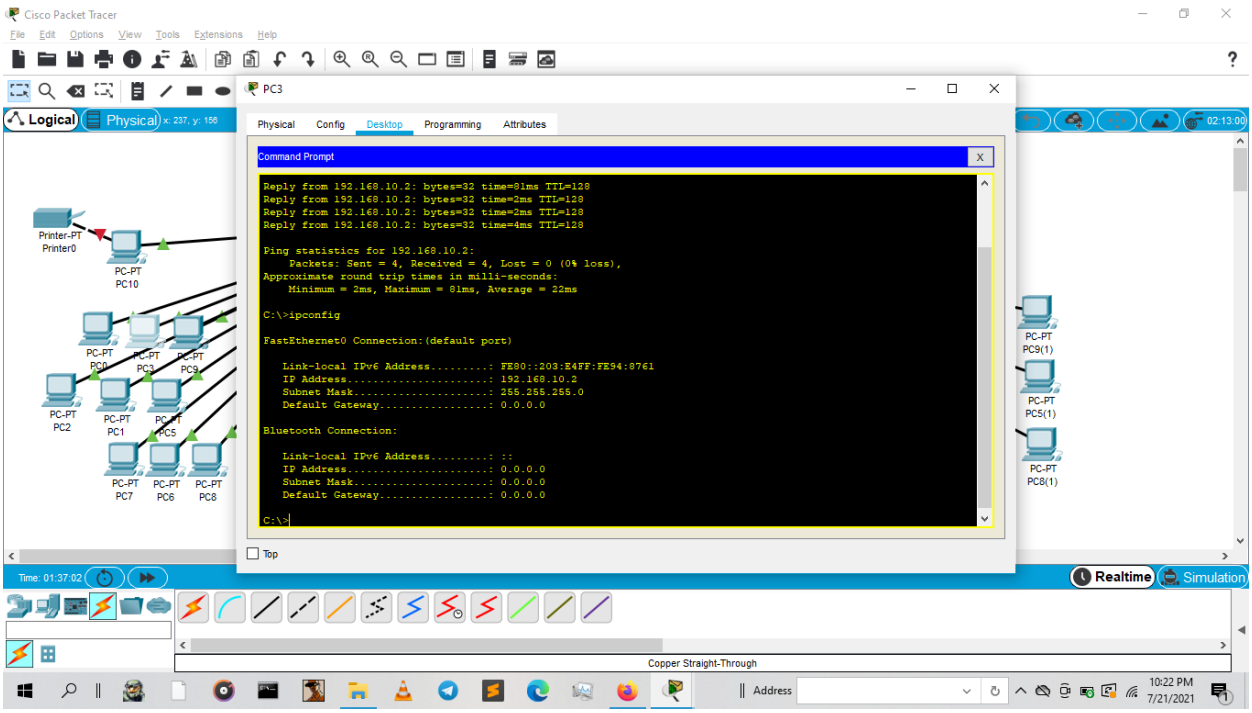
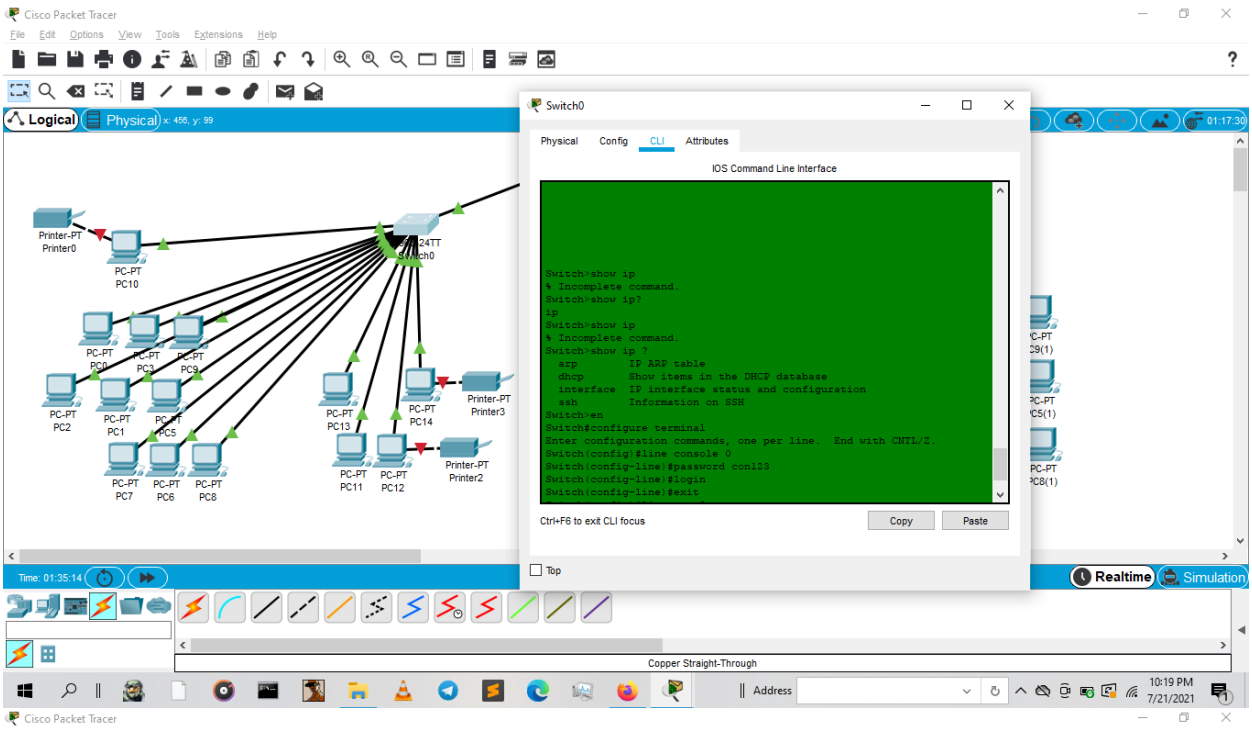
Realtime Simulation
Copper Straight-Through
Address
10:21 PM 7/21/2021


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical x: 237, y: 156
PC3
Physical Config Desktop Programming Attributes
Command Prompt
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.2
Pinging 192.168.10.2 with 32 bytes of data:
Reply from 192.168.10.2: bytes=32 time=81ms TTL=128
Reply from 192.168.10.2: bytes=32 time=2ms TTL=128
Reply from 192.168.10.2: bytes=32 time=2ms TTL=128
Reply from 192.168.10.2: bytes=32 time=4ms TTL=128
Ping statistics for 192.168.10.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 81ms, Average = 22ms
C:\>
Top
Printer-PT Printer0
PC-PT PC10
PC-PT PC0
PC-PT PC3
PC-PT PC9
PC-PT PC2
PC-PT PC1
PC-PT PC5
PC-PT PC7
PC-PT PC6
PC-PT PC8
PC-PT PC9(1)
PC-PT PC5(1)
PC-PT PC8(1)
Time: 01:36:52
Realtime Simulation
Copper Straight-Through
Address
10:21 PM 7/21/2021


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
PC3
Physical Config Desktop Programming Attributes
Command Prompt
Reply from 192.168.10.2: bytes=32 time=81ms TTL=128
Reply from 192.168.10.2: bytes=32 time=2ms TTL=128
Reply from 192.168.10.2: bytes=32 time=2ms TTL=128
Reply from 192.168.10.2: bytes=32 time=4ms TTL=128
Ping statistics for 192.168.10.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 81ms, Average = 22ms
C:\>ipconfig
FastEthernet0 Connection:(default port)
Link-local IPv6 Address.....: FE80::203:E4FF:FE94:8761
IP Address.....: 192.168.10.2
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 0.0.0.0
Bluetooth Connection:
Link-local IPv6 Address.....: ::
IP Address.....: 0.0.0.0
Subnet Mask.....: 0.0.0.0
Default Gateway.....: 0.0.0.0
C:\>
Top
Logical Physical
Printer-PT Printer0
PC-PT PC10
PC-PT PC0
PC-PT PC3
PC-PT PC9
PC-PT PC2
PC-PT PC1
PC-PT PC5
PC-PT PC7
PC-PT PC6
PC-PT PC8
PC-PT PC9(1)
PC-PT PC5(1)
PC-PT PC8(1)
Time: 01:37:02
Realtime Simulation
Copper Straight-Through
Address
10:22 PM
7/21/2021


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical
Switch0
Physical Config CLI Attributes
IOS Command Line Interface
Switch>show ip
% Incomplete command.
Switch>show ip?
ip
Switch>show ip
% Incomplete command.
Switch>show ip ?
arp IP ARP table
dhcp Show items in the DHCP database
interface IP interface status and configuration
ssh Information on SSH
Switch>en
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#line console 0
Switch(config-line)#password con123
Switch(config-line)#login
Switch(config-line)#exit
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
Printer-PT Printer0
PC-PT PC10
PC-PT PC0
PC-PT PC3
PC-PT PC9
PC-PT PC2
PC-PT PC1
PC-PT PC5
PC-PT PC7
PC-PT PC6
PC-PT PC8
PC-PT PC13
PC-PT PC14
Printer-PT Printer3
PC-PT PC11
PC-PT PC12
Printer-PT Printer2
Time: 01:35:14
Realtime
Simulation
Copper Straight-Through
Address
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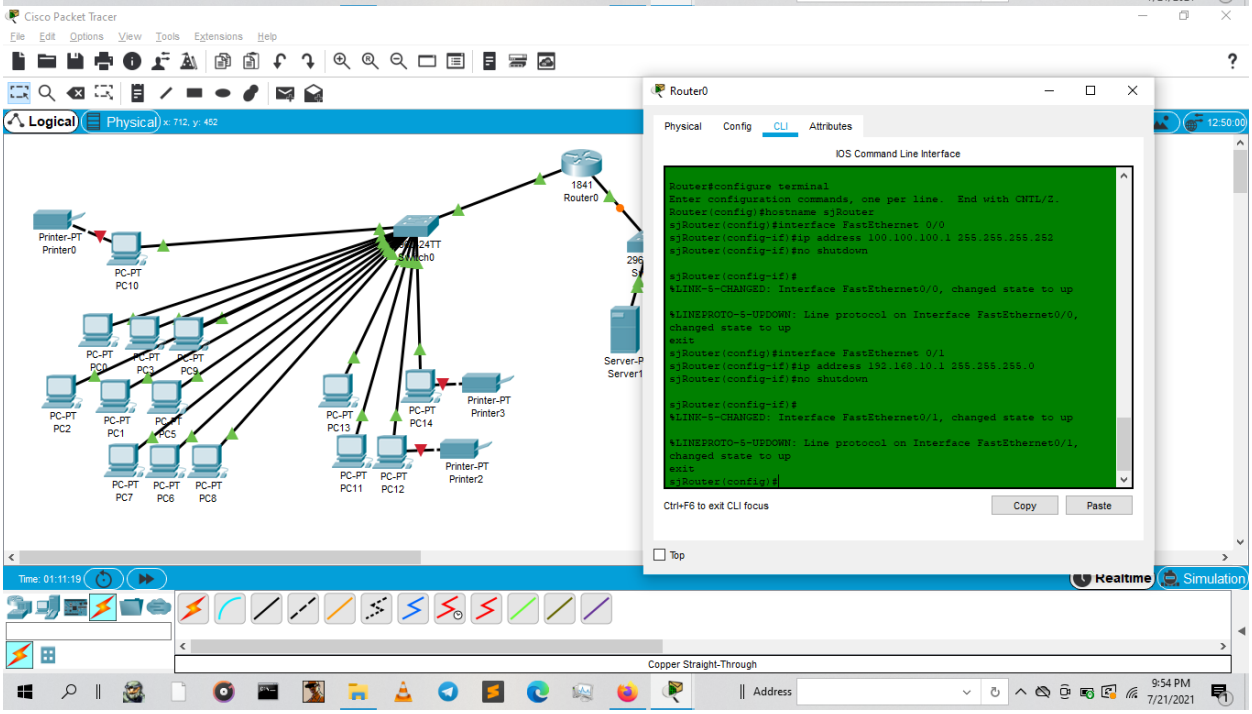
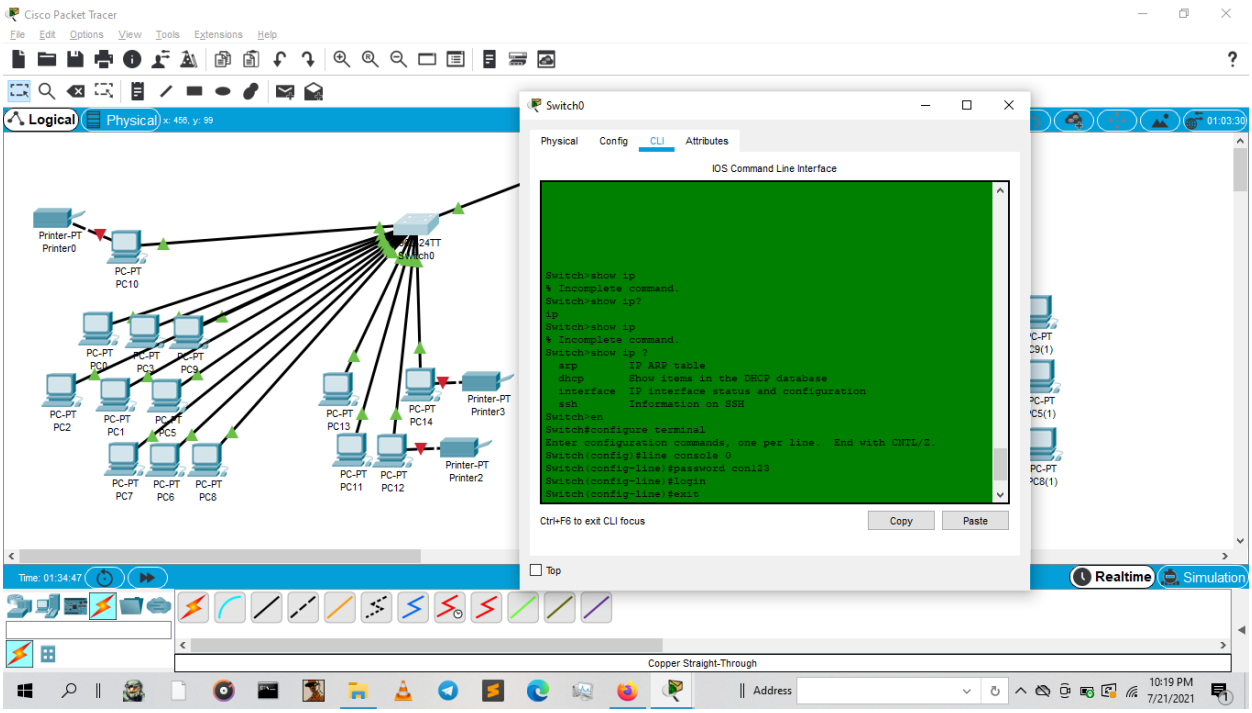
7/21/2021


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical
Router0
Physical Config CLI Attributes
IOS Command Line Interface
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname sjRouter
sjRouter(config)#interface FastEthernet 0/0
sjRouter(config-if)#ip address 100.100.100.1 255.255.255.252
sjRouter(config-if)#no shutdown
sjRouter(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
sjRouter(config)#interface FastEthernet 0/1
sjRouter(config-if)#ip address 192.168.10.1 255.255.255.0
sjRouter(config-if)#no shutdown
sjRouter(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
exit
sjRouter(config)#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
1841 Router0
Server-PT Server1
Time: 01:11:19
Realtime
Simulation
Copper Straight-Through
Address
9:54 PM
7/21/2021



Activity 08

Improving security

1. Access control
2. Anti-malware
3. Application security
4. Behavioural analytics
5. Data loss prevention
6. Email security
7. Firewalls